**Linear Algebra and Complex Analysis (MAL 151)**

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| **Course no: MAL 151** | | **Open course (YES/NO)** | | | **HM Course (Y/N)** | **DC (Y/N)** | | **DE (Y/N)** | |
| **NO** | | | **N** | **N** | | **N** | |
| **Type of course** | | Theory | | |  |  | |  | |
| **Course Title** | | Linear Algebra and Complex Analysis | | | | | | | |
| **Course Coordinator** | | Dr. AmitMahajan | | | | | | | |
| **Course objectives:** | | This course covers matrix theory and linear algebra, emphasizing topics useful in other disciplines. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering. Also, this course covers basic concepts of complex analysis, such as limit, continuity, differentiability and integration, and also related theorems. | | | | | | | |
| **POs** | |  | | | | | | | |
| **Semester: 2nd** | | | **Autumn:** | | | **Spring: Yes** | | | |
|  | | | **Lecture** | **Tutorial** | | **Practical** | **Credits** | | **Total Teaching Load** |
| **Contact Hours** | | | 3 | 1 | | 0 | 4 | | 48 |
| **Prerequisite course code as per proposed course numbers** | | | Nil | Nil | |  |  | | |
| **Prerequisite credits** | | | Nil | Nil | |  |  | | |
| **Equivalent course codes as per proposed course and old course** | | | Nil | Nil | |  |  | | |
| **Overlap course codes as per proposed course numbers** | | | Nil | Nil | |  |  | | |
| **Text Books:** | | | | | | | | | |
| 1. | | | Title | *Linear Algebra and its Applications* | | | | | |
| Author | David C. Lay | | | | | |
| Publisher | Pearson Pub. | | | | | |
| Edition | 2011 | | | | | |
| 2. | | | Title | *Complex variables and its applications* | | | | | |
| Author | R. V. Churchill | | | | | |
| Publisher | McGraw Hill | | | | | |
| Edition | 1960 | | | | | |
| **Reference Book:** | | | | | | | | | |
| 1. | | | Title | *Introduction to Linear Algebra* | | | | | |
| Author | Gilbert Strang | | | | | |
| Publisher | Cambridge Press | | | | | |
| Edition | 2009 | | | | | |
| 2. | | | Title | *Advanced Engineering Mathematics* | | | | | |
| Author | E. Kreyszig | | | | | |
| Publisher | John Wiley and Sons | | | | | |
| Edition | 2008 | | | | | |
| **Content** | **Unit I: Linear Algebra:** Elementary of row and column operations on a matrix, Rank of a matrix, Normal form, Inverse of matrix, Systems of linear equation and their solutions, Vector space and its subspaces, Spanning sets and linear independence, Determinant properties, Linear transformation, Range space and Rank, Null space and nullity, Eigenvalues and eigenvector, Diagonalization of matrices, Similarity of matrices, Inner product, Gram Schmidt process, Least square approximations. (24 hours)  **Unit II: Complex Analysis:** Complex number and elementary properties, Complex functions-Limit, continuity and differentiability, Polar form of Complex number, Cauchy Riemann Equations, Analytic and Harmonic functions, Cauchy’s Theorem, Cauchy’s Integral formula, Taylor and Laurent’s series expansion, Zeros and singularities, Residues, Residue theorem and its applications. (24 hours) | | | | | | | | |
| **Curse Assessment** | Continuous Evaluation 25%  Mid Semester 25%  End Semester 50% | | | | | | | | |